capable of judging are unanimous in praising its extreme accuracy, justice, and completeness. 1878 and 1879 saw the publication of the essays on Apogamy, and on Symbiosis, two bright and suggestive papers, which have had a wide influence on succeeding work, and which connect De Bary's name paternally with new doctrines in biology.

In 1881 he was busy with the promulgation of his new facts and deductions in connection with the *Peronosporeæ*, and the phenomenon of apogamy in the Fungi. In addition to articles in the *Botanische Zeitung* on the classification of the Thallophytes generally, and of the Fungi in particular, he published extended and important observations on the *Saprolegnieæ* and *Peronosporeæ* (the 4th number of the "Beitrage zur Morph. u. Phys. d. Pilze."), and the philosophical scheme of classification of the Fungi which forms the basis of our present system. Space will not admit of our referring further to his other memoirs, and it is impossible to even mention the numerous illuminating ideas and suggestions which are scattered through his papers, for we must proceed to the passing enumeration of his last two books, either of which would have sufficed for the reputation of an ordinary great man.

In 1884 was published his "Comparative Morphology and Biology of the Fungi, Mycetozoa, and Bacteria," and the best idea of De Bary's influence can be obtained by comparing this work with his "Morph. u. Phys. d. Pilze, Flechten, u. Myxomyceten," published eighteen years previously.

In 1885, De Bary brought together a series of lectures on Bacteria, since published in the form of a book: it is in his best style, and brings before the reader by far the clearest trustworthy general account of this astonishing and fruitful subject. Here, as everywhere, to take a subject in hand was to aid it: had De Bary done no more for "bacteriology" than observe and clearly describe the development of the spores of *Bacillus Megaterium*, his influence would have been felt; and the student is especially indebted for his careful sifting of the literature, and his suggestive indications.

One of his latest efforts was on the subject of infection, particularly with reference to certain *Pezizæ* and Sclerotia: he placed firmly on record the discovery that some of these Fungi may be harmless saprophytes until they have been cultivated—educated up to a higher degree of power—and then they can enter into and destroy a living host, which resisted them previously.

It should also be remembered that he was for many years editor of the *Botanische Zeitung*, and lent his aid to the forwarding of numerous botanical projects.

The above sketch may serve to convey some idea of the labours of the great Strassburg botanist. But, although they give a glimpse of the specialist's results, they afford no insight into his keen appreciation of all good work; of his humorous and never malicious disposition, in the laboratory, and in his writings; and of his sharp, but always just, criticism of anything pretentious. Nor is it possible to enter here into his abundant knowledge of species: he was one of the first to grasp Darwin's teachings, and perhaps never misapplied them. His close acquaintance with species and even local varieties of the plants around Strassburg, at any rate, could only be known to those who have walked with him; and the delight of those walks in Alsace!

As a lecturer he was not brilliant: he appeared shy and nervous when on the daïs, but in spite of his low voice and restless fingers he kept his hearers interested, and always taught clearly. Quaint he often was, in speech and manner, but the impressive truthfulness of his nature, the earnestness of his teaching, and the absence of any striving after effect, gave to his very quaintness a charm and dignity the influence of which will never be forgotten so long as his pupils live. H. MARSHALL WARD.

NOTES.

WE print to-day a leading article on "Odium Medicum." As the questions to which it relates have already been fully discussed in the *Times*, it may be well to state that we do not intend to publish any correspondence on the subject.

SOME time ago the Australian Governments, through Sir Graham Berry, represented to the Home Government the fact that in their opinion much good might be done by an "Antarctic *reconnaissance*," preliminary to an expedition for the thorough exploration of the Antarctic regions. In order that this suggestion might be carried out, the Australian colonies offered to contribute £5000, on condition that a like sum should be given by the mother country. The proposal was supported by the Colonial Office, by the Royal Society, and by the Royal Geographical Society; nevertheless, the Treasury has announced that it does not see its way to the granting of an Imperial contribution. The objects to be attained do not seem to it to justify the payment of even so small a sum as £5000. There will, of course, be much disappointment in the Australian colonies, but it may be hoped that the idea of a joint Antarctic Expedition will not be abandoned. Perhaps a larger scheme than the one which has just been rejected would have had a better chance of success.

THE scientific education of the mining population of Cornwall was for many years in the hands of the Miners' Association of Cornwall and Devon—an institution founded in 1859, at the suggestion of the late Mr. Robert Hunt, F.R.S. Some time ago this body was amalgamated with another Cornish institution, and the united organization took the name of the Mining Association and Institute of Cornwall. A movement has just been set on foot for increasing the efficiency of this Association by the formation of a Museum of Mineralogy, to be established at Redruth, or elsewhere, in the heart of the great tin and copper mining district. It is held that such an institution will in no way interfere with the existing museums in the county—such as those of the Royal Institution at Truro, and of the Royal Geological Society at Penzance. The new museum, instead of seeking to exhibit attractive specimens, will be essentially practical and educational—a place for the earnest student rather than for the casual visitor. It will endeavour to collect characteristic samples of ores, and typical specimens of such other minerals as are of interest to the miner or to the geologist. In recognition of the services which Mr. Robert Hunt rendered to Cornwall by his persistent advocacy of the necessity of giving the young miners a scientific training, it is proposed that the new museum shall bear his name. The Committee appeals for contributions, either in money or in minerals, and for suggestions as to the development of the scheme. Communications should be addressed to Mr. T. C. Peter, Town Hall, Redruth.

MR. J. E. HARTING has been appointed Librarian and Assistant Secretary to the Linnean Society at Burlington House, in the place of Dr. Murie, resigned. Mr. Harting has for some years past been engaged in fulfilling the duties of Zoological Librarian at the Natural History Museum, South Kensington, where he has organized what is now the best zoological library in this country, although possibly not the largest in regard to the number of volumes. The new appointment has been made opportunely at the expiration of the Government grant for the purchase of books at South Kensington, and has given general satisfaction.

THE forty-first annual general meeting of the Institution of Mechanical Engineers will be held on Thursday, February 2, and Friday, February 3, at 25 Great George Street, Westminster. The chair will be taken by the President, Mr. Edward H. Carbutt, at half-past 7 p.m. on each evening. The discussion on Mr. John Richards's paper, on "Irrigating Machinery on the Pacific Coast," will be resumed. The following papers will be read and discussed, as far as time permits:—"On the Position and Prospects of Electricity as applied to Engineering," by Mr. William Geipel, of Edinburgh; "Third Report of the Research Committee on Friction: Experiments on the Friction of a Collar Bearing."

THE 1888 Conference of the Camera Club, the central institute for amateur photographers, will be held in the theatre of the Society of Arts on Tuesday and Wednesday, March 13 and 14, under the presidency of Capt. W. de W. Abney, F.R.S.

THE eighth annual general meeting of the Essex Field Club will take place at the Public Hall, Loughton, Essex, on Saturday evening, January 28, at seven o'clock. Mr. T. Vincent Holmes will deliver the annual Presidential address, taking as his subject "The Subterranean Geology of South-Eastern England."

A PUBLIC Conference on the Sanitary Registration of Buildings Bill will be held at the Society of Arts, John Street, Adelphi, on Saturday, February 4. The chair will be taken at 4 o'clock by Sir Joseph Fayrer, F.R.S.

A NATIONAL Hydrographical, Meteorological, and Climatological Congress is to be held at Madrid in February.

THE American Society of Naturalists held its annual meeting in the Peabody Museum, New Haven, on December 27 and the two following days. *Science* explains that this Society, composed of professors and specialists, leaving to other scientific associations the function of presenting and discussing results, devotes itself to the publication of new methods, improved apparatus, and aids to science-teaching. The work of the Society falls into two sections—biology and geology—and a day of each meeting is devoted to each of these topics, while the third day is given over to a general discussion on some attractive subject. The attendance at the recent meeting was large, and, according to *Science*, the proceedings were both interesting and profitable.

THE *Monthly Weather Review*, published by the Chief Signal Officer of the United States for October 1887, contains a discussion of the movements of high barometer areas over the North Atlantic Ocean for the year 1885. Fifty-two well-defined areas passed off the coast, of which seven traversed the ocean to Europe, and three moved north-easterly, to the vicinity of Iceland. The average time occupied by the fifty-two anticyclones in advancing from the 90th meridian to the coast was about one day and a half, this rate of progression being considerably greater than the average velocity of cyclonic areas over that region. These areas of high pressure have an important influence on the paths of storms. During October 1887 the paths of sixteen depressions are also traced; four advanced eastward over Newfoundland, one of which traversed the ocean from coast to coast.

THE Meteorological Council have published the observations taken at stations of the second order during the year 1883 (218 pp. large 4to). Observations taken twice a day are printed *in extenso* for thirty stations, and monthly and annual summaries and extremes for forty-four stations. The positions of the stations are shown upon a key-map, but the map also shows that considerable districts in the west of Scotland and Ireland, and even on the east coast, for instance between Dundee and Seaham, are still unrepresented. The barometer observations (reduced to mean sea-level) are given to the nearest ·01 inch, instead of the ·001 inch as heretofore. There is also a useful summary of the hours of bright sunshine for the stations which are furnished with sunshine-recorders, but the yearly values are not calculated.

WE have received a sheet on which are three photographs of the total eclipse of the sun, August 19, 1887, taken at Yōmeiji-yama (long. 138° 59′ 23″ E., lat. 37° 37′ 13″ N., alt. 115 metres), Echigo, Japan, by M. Sugiyama, the observer of the Tokio Observatory, under the direction of I. Arai, the Director of the Tokio Observatory and the chief of the Expedition. The photographs were taken in the following order: L.M.T. 3h. 40m. 36·5s. (1m. 8s. after beginning of totality); L.M.T. 3h. 41m. 25·4s. (1m. 57s. after beginning of totality); L.M.T. 3h. 42m. 6·2s. (34s. before end of totality). In sending us these photographs, Mr. I. Arai writes to us:—"While bad weather prevented nearly all the observations at other stations in our country, I was very fortunate, my station being entirely free from clouds, at least during the totality. But I regret to inform you that, as we were not equipped with complete instruments, and the telescope used was only of small size and not sufficient for photographic purposes, the result was not very satisfactory, because some of the coronal rays, extending outside of the field of the telescope, do not appear in the photographs. I did not, however, like to make the least modification, neither in size, nor in shape, believing that it would be best to leave the actual phenomena just as represented by the photographic apparatus."

SEVERE earthquakes are reported from Ontario and Quebec on January 11, but no damage was done. Shocks are also reported from Columbia (South Carolina), Summerville, and Charlestown. According to a telegram sent from New York on January 23, three shocks had occurred at Newburyport, in Massachusetts.

MESSRS. MACMILLAN have arranged to publish in their "Student's Series" a new biological text-book, "Lessons in Elementary Biology," by Prof. T. Jeffery Parker, of the Otago University, New Zealand. The book will be written on a modification of the "type" system, the earlier chapters consisting of detailed accounts of the morphology, physiology, and life-history of selected examples of the lower organisms. Briefer accounts of important types of the higher animals and plants will be given, but, as the work is intended for the study and not for the laboratory, it will not be necessarily limited to readily accessible forms, and the plan will sometimes be adopted of omitting certain points of structure, development, &c., which from their complexity or aberrant character are unsuited to an elementary work. The book will be written throughout in such a way as to bring clearly before the student the fundamental principles and generalizations of biology, and will be fully illustrated. It is hoped that it may serve to supplement the lecture-notes of a student attending an ordinary junior University course of biology, and, in the case of one working independently, to supply the connected narrative which is not readily obtained in suitable form either in a laboratory manual or in the ordinary text-books of zoology and botany.

THE "Zoological Record" for 1886 has just been issued. For sixteen years the annual volume of this most useful work was issued by the "Zoological Record" Association, which was aided by grants from various sources. At the close of 1886 the Association failed to obtain the renewal of some of these grants; and, being unwilling to carry on the publication of the "Record" any longer, it came to an agreement with the Zoological Society, by which the task was undertaken. The Council of the Zoological Society appointed a Select Committee to superintend the new enterprise, and Mr. F. E. Beddard was made editor. In the preface to the present volume Mr. Beddard explains that the only change he has made is the introduction of a section devoted to general subjects. This includes text-books and works of a general nature, many of which are again recorded under the several groups with which they are more especially concerned.

UNDER the title "A Year's Insect-Hunting at Gibraltar," there appears in the January number of the *Entomologist's Monthly Magazine*, a valuable paper by Mr. James J. Walker, on the entomology of Gibraltar, concerning which subject next to nothing had previously been written. Mr. Walker, as an officer of H.M. gunboat *Grappler*, stationed there, had ample opportunities for studying the insect-fauna. His observations are mainly confined to *Lepidoptera* and *Coleoptera*. He says there is scarcely a day throughout the year on which butterflies may not be found; and he enumerates fifty-five species for the limited district, thirty of which have occurred on the isolated Rock itself. *Coleoptera* are very numerous, and he has already found 900 species, and is almost daily adding to the number. Apart from its purely entomological interest, the introductory portion is of great value, being a lucid *résumé* in a few pages of the topography of the Rock and the immediate neighbourhood, with sketches of the chief botanical, zoological, geological, and meteorological features, not forgetting the Barbary apes, which, reduced a few years ago to less than a dozen individuals, are now so numerous as to cause serious depredations in the gardens.

WE have received the volume for 1886 of the Journal and Proceedings of the Royal Society of New South Wales. Among the contents may be noted the Presidential Address by Prof. Liversidge, F.R.S.; description of an unrecorded Ardisia of New Guinea, by Baron von Mueller, F.R.S.; a comparison of the dialects of East and West Polynesian, Malay, Malagasy, and Australian, by the Rev. G. Pratt; preliminary notes on some new poisonous plants discovered on the Johnstone River, North Queensland, by T. L. Bancroft; notes on the process of polishing and figuring 18-inch glass specula by hand, and experiments with flat surfaces, by H. F. Madsen; notes on the theory of dissociation of gases, by Prof. R. Threlfall.

A LARGE number of new aromatic fluorine substitution products have recently been prepared by Drs. Wallach and Heusler (*Liebig's Annalen*, Band 243, Heft 1 and 2), the properties of which point to some interesting conclusions regarding the physical nature of fluorine itself. It is found that in all cases the specific gravity of a compound is raised by the introduction of fluorine instead of hydrogen. Thus while benzene at 20° has the specific gravity 0·8846, fluorbenzene, C_6H_5F, at 20° possesses a specific gravity of 1·0236. But, on the other hand, the substitution of fluorine is found to have a remarkably small effect in raising the boiling-point; for instance, fluorbenzene enters into ebullition at 85° C., a temperature only 5° higher than that of boiling benzene. What is, however, still more interesting is the fact that the difference between the boiling-points of corresponding iodine and bromine substitution products, and again between those of bromine and chlorine is smaller than that between the substitution derivatives of chlorine and fluorine. Whilst this difference of boiling-point between corresponding bromides and chlorides amounts to 20–23°, that between chlorides and fluorides approaches 40°. This fact, coupled with the small influence which the substitution of fluorine exerts upon the boiling-point, indicates the interesting probability that the boiling-point of free fluorine itself lies very much below that of chlorine ($-33°·5$), and that fluorine much more nearly approaches the volatility of hydrogen. Indeed, it appears likely that fluorine is one of the so-called permanent gases, and might form a worthy object for the attentions of those who have been so successful in inducing the other "permanent" gases to reveal their boiling-points; the difficulties in the way would of course be immense, but, in face of what has been done, are not perhaps insuperable. Under all circumstances fluorine attaches itself to carbon with far greater tenacity than any of the other halogens, as was clearly shown by leaving one of the new fluorides, bromfluorbenzene, C_6H_4BrF, in cold ethereal solution in contact with metallic sodium. After eight days a considerable quantity of sodium bromide had formed, but not a trace of the fluoride of sodium. The fluor-compounds themselves form a most valuable contribution to organic chemistry, and fill up a gap which has long been noticeable in the literature of the subject.

MR. J. A. CROWE, Her Majesty's Commercial Attaché for Europe, reports to the Board of Trade that the French Legislature has recently passed a law enacting that a prize will be given to the discoverer of a simple and practical test to ascertain the presence in spirits and alcoholic drinks of substances other than pure and ethylic alcohols. The conditions under which the award is to be made will be determined by the Academy of Sciences of the French Institute.

IN the last number of the *Zoologischer Anzeiger*, Dr. Otto Zacharias earnestly recommends the establishment of a zoological station on a German lake for the observation and study of the freshwater fauna.

THE other day three ladies in India received the degree of B.A.,—two at the University of Calcutta, and one at the University of Bombay.

A SEAM of good coal is reported to have been discovered in Cashmere. An officer of the Indian Geological Survey is to be sent to examine it.

RECENTLY an elk was shot in Galicia. It is now 130 years since the last of these animals was killed in Austria. It is believed that the one referred to had come from Lithuania.

IT is generally believed that the Polar bear cannot be tamed. Last autumn, however, a Norwegian skipper brought one of these bears with him from the Arctic Sea to Tromsö, and it has become quite tame. The bear plays like a dog with the crew of the vessel, and follows its master everywhere. It is nearly full grown.

THE Spitzbergen whale-fisheries have been more remunerative during the last two years than at any time during the past quarter of a century. Last year 1311 animals were killed. The whalers are English, Russian, and Norwegian.

A MAGNIFICENT gift has lately been received by the Ethnological Museum at Leipzig, from Dr. Alphonse Stübel (Dresden), Dr. Wilhelm Reiss (Berlin), and Consul-General Benedix Koppel (London). It consists of a rich collection of articles illustrating the culture and industry of ancient and modern South American races. The collection is divided into two parts: the first being objects belonging to the period before the Spanish conquest, the second being modern. There are many figures, vessels, weapons, and implements of stone and clay, found in the old Columbian, Bolivian, and Peruvian tombs, as well as ancient silver, copper, and bronze ornaments from Ecuador and Peru. The Columbian antiquities, and the ancient gold objects of the Chibchas, are specially noteworthy.

THE additions to the Zoological Society's Gardens during the past week include two Snow Finches (*Montifringilla nivalis*), European, presented by the Lord Lilford; two Cockateels (*Calopsitta novæ-hollandiæ*) from Australia, two Pale-headed Parrakeets (*Platycercus pallidiceps*) from North-East Australia, presented by the Hon. Stormont Finch-Hatton; an African Buzzard (*Buteo desertorum*) from Africa, presented by Mr. Sydney H. Carr, four Barbary Turtle Doves (*Turtur risorius*) from North Africa, presented by Mr. John Biehl; two Herring Gulls (*Larus argentatus*), British, presented by Mr. Thomas A. Cotton; a Common Barn Owl (*Strix flammea*), British, by Mr. Hugh Bromley; a Moorish Gecko (*Tarentola mauritanica*) from France, presented by Mr. J. C. Warbury; two Viscachas (*Lagostomus trichodactylus*) born in the Gardens.